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Selective voltammetric and flow-injection determination of guanine and adenine on a glassy carbon electrode modified by a ruthenium hexachloroplatinate film

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Abstract

An inorganic film of ruthenium hexachloroplatinate (RuPtCl6), deposited on the surface of a glassy carbon electrode, exhibits electrocatalytic activity in the oxidation of purine bases, such as adenine and guanine. Appropriate working conditions are found for fabricating a polymer film on the surface of glassy carbon and for recording the maximum electrocatalytic effect for the modified electrode. A method is developed for the selective voltammetric determination of guanine and adenine in their simultaneous presence on an electrode modified by a RuPtCl6 film. A procedure is proposed for the amperometric detection of purine bases with this modified electrode under the conditions of flow-injection analysis. The dependence of the analytical signal on the concentration of guanine and adenine is linear up to 5 × 10 -6 and 5 × 10-7 M in the stationary mode and to 5 × 10-7 and 5 × 10-8 M under flow conditions, respectively. The proposed method was tested in the analysis of calf thymus DNA for the concentrations of guanine and adenine. © 2014 Pleiades Publishing, Ltd.

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Keywords

adenine, chemically modified electrodes, electroanalysis, electrocatalysis, flow-injection analysis, guanine, inorganic polymer films, ruthenium hexachloroplatinate